

# ECONOMIC ANALYSIS OF FISH PRODUCTION IN IKENNE LOCAL GOVERNMENT AREA, OGUN STATE

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## **Abstract**

*This study examined the economic analysis of fresh fish production in Ikenne Local Government Area, Ogun State. It examined the socio-economic characteristics of fish producers, cost and returns structure of the fish farms, major constraints to growth and expansion of fish producers. To achieve these objectives, both primary and secondary data were used. The study drew a sample of 80 fish producers identified through a purposive sampling technique. Questionnaires were used to obtain data from the fish producers on demographic variables, production output and cost incurred. Data were analyzed using frequencies, gross margin and budgetary analysis. Results indicated that the cost and returns structure of the fish production and that the average fixed cost for the farms was ₦104,393.67 with the cost of pond construction accounting for 27.65% and cost of fence accounting for 56.03%. Analysis of variable cost showed that the average variable cost was ₦291,505.80 with cost of feed and labour accounting for 0.64% and 30.2% respectively. The average revenue was ₦4,194,487.50, average gross margin ₦3,902,981.63 while the average net profit was ₦3,799,469.13. It is however recommended that there should be provision of credit facilities for the fish producers by financial agencies and government in order to meet up with high cost of feed and other variables cost items.*

Fishing has been a major source of food for humanity. Fish is the wild and common resource available for harvest as sources of food and income comparatively richer in essential amino acids than meat (Tobor, 1994). It is an excellent supplement in diets with high carbohydrate content. The high content of polyunsaturated fatty acid in fish is important controlling the cholesterol level in human blood. For the nutritional status of the people to be improved upon intensive animal including fish production should be encouraged and their productivity enhanced.

The fishing industry has generated employment as well as contributed immensely to economic and social well being of Nigerians. Globally, during the past

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decades, employment in fishing and aquaculture has grown faster than employment in Agriculture (FAO, 1999). Fish farming in particular generates employment both directly and indirectly. It contributes indirectly in terms of people employed in the production of fishing input and in other allied business. It also generates direct employment and income for all categories of people involved in fish farming, thereby contributing to the national income. When compared to livestock, it requires less space, time and money. Fish has a higher feed conversion rates, it also allows for research and manpower development among others.

Commercially, fish production has great potential for reducing the dietary deficiencies among Nigerians. One of its advantages is the ability of many commercial fish species to convert organic wastes such as sewage, piggery and poultry wastes, cow dung and other organic industrial by-products into useful protein efficiently, According to the Federal Department of Fisheries (FDF 2000), the estimated fish production in Nigeria as at year 2000 was 908.474 tonnes out of which aquaculture contributed just 25,720 tonnes (i.e. 2.5% of local fish production). Aquaculture thus, needs to be encouraged among Nigerians.

### **Development of Aquaculture in Nigeria**

Pillay (1979) defined aquaculture as the natural rearing of fish and other aquatic organisms in man-made ponds or in other enclosures whether for commercial sport, ornamental or for research purposes. Polk (1991) said it is the science of cultivating fish and other underwater species for food. The Food and Agriculture Organization (1991) on its part defined it as the farming of aquatic organisms. Thus, aquaculture can be said to comprise all processes involved in the rearing of aquatic organisms either for economic or social benefits.

Aquaculture is an important sub-sector of the fishery industry in Nigeria. It is the channel through which both government and private institutions and individuals obtain income by raising of living organisms, mainly fish in water. In Nigeria, there are many roles which aquaculture can serve in the development process. Inadequacy of both animal and plant protein in the average Nigerian diet is a common knowledge. Protein intake by an average Nigerian is less than one half of the protein needed for proper body functioning (Ridler and Brugers 2004). The problem of protein deficiency can be solved by improving the state of aquaculture in Nigeria, and especially its level of productivity. Fortunately, Nigeria is well endowed with both inland and oceanic water resources that are presently under utilized in aquaculture (Kolawole 1998).

Aquaculture can be broadly divided into two (2) types namely: extensive culture and intensive culture. Aquaculture in natural water is unusually extensive. In extensive fish culture, fishes are held in a situation where majority of the food available are natural food and with few or no modification of inputs and control of the environment. The fish is cultured over a long period of time while aquaculture in artificial water is intensive. Intensive fish culture is maintained in units, in such high densities that little natural food

is used. It is highly monitored in terms of quality, input and control of physical, chemical and abiotic components of the system. The fish is cultured under shortest possible time. Intensive culture includes: monoculture, monosex culture, polyculture, fish ranching and cage culture.

### **Importance of Fish Production in Nigeria**

Fish production generates income for the private fisherman, the industrial sector as well as government fisheries and fisheries products contributed about eight percent (8%) to the total Gross Domestic Product (GDP) in 1989 (Mabawonku 1989). It creates employment opportunity for over one million Nigerians either directly or indirectly in fisheries activities all over the country. Nigeria has not less than ten commercially important fish species and shell fish that can be profitably cultured to provide fish for local consumption as well as export.

### **Problem Statement**

Aquaculture has not been fully exploited in Nigeria despite the country's high potential for commercial fish farming. Apart from the availability of a ready market, the Nigerian Institute of Oceanography and Marine Research (NIOMR) (1984) has confirmed that Nigerian water can produce annually thousands of metric tonnes of fish and fish products. Moreover, planning or agriculture development in Nigeria is currently plagued with several problems including lack of information about the status, performance and constraints of sub-sectors. Consequently, there exists a need to examine the production practices, prospect and problems affecting fish production in Nigeria.

### **Objectives of the Study**

The main objective of this study is to analyse the economic prospects of fish production in Ikenne Local Government Area, Ogun State.

The specific objectives are to:

- (i) Describe the socio-economic characteristics of aquaculture proprietors;
  - (ii) Examine the cost return structure and profitability of fish production; and
- Identify the major constraint to growth and expansion of fish production.

### **Research Methodology**

#### **Study Area and Methods of Data Collection**

The area of study is Ikenne Local Government Area, Ogun State. The study utilized primary data collection through the use of structured questionnaires. The questionnaires were drawn to obtain information on the socio-economic characteristics, production output and cost incurred by the sampled respondents who are producers of live fish in the study area.

#### **Sampling Procedure**

Purposive sampling technique was used to obtain primary data by a complete enumeration of eighty fish producers. Information were gathered with structured

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questionnaires from managers and foremen on the different fish farms in the study area. Specifically, data were sought on man power and labour input and cost and return to operation among others. A total number of eighty (80) fish producers were sampled.

**Methods of Data Analysis**

To analyse the socio-economic characteristics of aquaculture proprietors and to identify the major constraints to growth and expansion of fish production, the descriptive statistics such as frequency and percentage were employed. While inferential statistics such as Budgetary and Gross Margin Analysis were used to determine the cost-return structure of the fish producers in the study area.

**Model Specification**

To analyze the cost-return structure and profitability of fish farming, Budgetary Analysis is employed.

**Budget Analysis**

- a)  $GM = TR - TVC$  ..... (1)
- b)  $NI = GM - TFC$  ..... (2)
- c) Profitability Index or Return on Sale =  $NI/TR$ ..... (3)
- d) The Rate of Return on Investment (%)  $RRI = (NI/TC) \times 10$  ..... (4)
- e) The Rate of Return on Variable Cost (%)  $RRVC = (TR - TFC) / TVC \times 100$  ..... (5)
- f) Operating Ratios =  $TVC/TR$ ..... (6)

Where:

GM = Gross Margin; TVC = Total Variable Cost; PI = Profitability Cost; TC = Total Cost

TR = Total Return; NI = Net Income; TFC = Total Fixed Cost

**Gross Margin Analysis**

To estimate the cost, revenue and gross margin for fish production, gross margin analysis is employed.

- a)  $GM = Total\ Return - Total\ Variable\ Cost$  ..... (7)

Where:

TR = Yield (kg/ha) x Market Price

Total Variable Costs are Operating Expenses.

**Results and Discussion****Table 1: Socio-Economic Characteristics of the Respondents**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Cumulative Percentage</b>
<b>Location</b>			
Ogere	20	25.0	25.0
Irolu	15	18.8	43.8
Ilisan	21	26.2	70.0
Ikenne	24	30.0	100
<b>Sex</b>			
Male	58	72.5	72.5
Female	22	27.5	100.0
<b>Educational Level</b>			
Primary	3	3.8	3.8
Secondary	16	20.0	23.8
NCE	7	8.8	32.5
Polytechnic	24	30.0	62.5
University	30	37.5	100.0
<b>Land Acquisition</b>			
Inherited	32	40.0	40.0
Leased	13	16.3	56.3
Purchased	35	43.8	100.0
<b>Ponds</b>			
Concrete Pond	61	76.3	76.3
Dug Out Pond	19	23.8	100.0
<b>Sources of Water</b>			
Borehole	56	70.0	70.0
Stream	18	22.5	92.5
Public Tap	6	7.5	100.0
<b>Other Occupation</b>			
Yes	49	61.3	61.3
No	31	38.8	100.0
<b>Lime Used</b>			
Wood ash	9	11.3	11.3
None	71	88.8	100.0

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#### **Fertilizer Used**

None	77	96.3	96.3
NPK	3	3.8	100.0

#### **Types of Feed**

Local Feed	5	6.3	6.3
Coppens	52	65.0	71.3
Local Feed and Coppens	16	20.0	91.3
Coppens and Pellets	7	8.8	100.0

#### **Reasons for Fish Production**

Rapid growth and marketable	30	37.5	37.5
Marketable and less time consuming	23	28.8	66.3
Rapid growth and profitable	15	18.8	85.1
Profitable and Marketable	12	15.0	100.0

#### **Sources of Finance**

Personal saving	32	40.0	40.0
Bank loan	48	60.0	100.0

#### **Marketing Channel**

Wholesales	47	58.8	58.8
Retails	33	41.2	100.0

#### **Poaching Curtailed Means**

Fence	10	12.5	12.5
Security	20	25.0	37.5
Personal Monitoring and Fence	17	21.3	58.8
Fence and Security Men	26	32.5	91.3
Personal Monitoring and Security Men	7	8.8	100.0

**Total**                      **80**                      **100**

From Table 1, the findings revealed that the sex distribution of the respondents showed that 72.5 percent of people engaged in fish production were male while 27.5 percent were female. The implication of this finding is that the male genders were more committed and ready to take risks that might be involved in the business. It also shows that fish production business is more of male occupation than female. The ownership distribution table shows that fish production business is mainly privately owned business. The implication of this is that the respondents will be able to monitor his/her business properly in order to earn high profit and he/she will want to work at length for the business growth and expansion. Education is an important factor in recognition and utilization of investment opportunities. The education distribution shows that all the respondents had formal education but the difference is their level of education. It shows that 37.5 percent of the respondents have university education which implies that majority of the respondents will be able to manage their business with good management techniques, and they will be willingly to accept new innovations and hence produce on a larger scale.

The land acquisition distribution showed that 43.8 percent of the land used by respondents was purchased. This indicates that there is enough land in the study area to purchase for fish farming. The distribution of types of pond used by the respondents showed that 76.3 percent was concrete pond using borehole water which was built by the respondents in the study area. This implies that the respondents will require enough money in building the pond which is an additional expense in maintaining the pond and changing of water to avoid infections. It also showed that the study area does not have enough stream or river for the respondents to engage in dug-out ponds. The distribution of types of feed used by the respondents showed that 65 percent of the respondents used coppens food to feed their fish which gives a rapid growth to increase their profit if they are fed well with coppens.

The distribution of sources of finance of the respondents showed that 60 percent of the respondents acquired their capital through bank loan which implies that most of the respondents depend mainly on bank loan which will make them to be more active in their business to make more profit so as to pay back the money borrowed with interest. The distribution of marketing channel showed that 58.8 percent respondents have their marketing distribution on wholesales bases through which they distribute their fish on time because of the ready market available for them.

### **Problems Encountered by the Fish Producers**

The distribution showed that 28.9 percent of the total respondents encountered inadequate capital, high cost of feed, lack of equipment in hatchery and electricity problems as the major problems facing the fish production in the study area. The implication of this is that they will not be able to invest as much as they want, the fish will not be able to grow as expected and this will reduce their profit. To be able to

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overcome these problems the suggested solution by the respondents are: Loans should be granted by government and banks at a lower rate; Reduction in cost of feed, good equipment in hatchery; Local feed should be produced in surplus and government should be involved in fish farming.

**Table 2: Distribution of Problems Faced by Fish Producers.**

Category	Frequency	Percentage	Cumulative Percentage
Inadequate capital, high cost of feed, lack of equipment in hatchery, electricity problem	23	28.9	28.9
Inadequate capital, high cost of feed, lack of equipment in hatchery, lack of information	16	20.1	49.0
Inadequate capital, high cost of feed, lack of equipment in hatchery, lack of government support	9	11.3	60.3
Inadequate capital, high cost of feed, No association of fish producers, lack of government support	9	11.4	71.1
Inadequate capital, high cost of feed, electricity problem, lack of government support	10	12.5	84.2
High cost of feed, lack of equipment, lack of information and training, lack of enough local feed	4	5.0	89.2
Inadequate capital, high cost of feed, lack of information, lack of government support	9	11.3	100.0

Source: Field Survey 2010.

### **Cost Return Structure and Profitability of Fish Production using Budgetary Analysis**

**Table 3: Budgetary Analysis of Fish Producers**

Items	Amount from all Respondents (₦)	Mean of respondents (₦)	Percentage Cost
<b>Total Revenue (TR)</b>	<b>335,559,000</b>	<b>4194487.5</b>	
Fingerling Cost	7,981,000	99,762.50	34.3
Feed Cost	149,470	1,868.37	0.64



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Fertilizer cost	22,000	275.00	0.095
Water cost	1,210,000	15,125.00	5.2
Labour cost	7,060,000	88,250.00	30.2
Other material cost	6,898,000	86,225.00	29.5
<b>Total variable cost (TVC)</b>	<b>23,320,470</b>	<b>291,505.87</b>	<b>100.0</b>
Fence	4,640,000	58,734.18	56.03
Pond	2,290,000	28,625.00	27.65
Fishing net	191,000	2,387.50	2.3
Scale	231,000	2,887.50	2.7
Others	929,000	11,759.49	11.2
			100.00
<b>Total Fixed Cost (TFC)</b>	<b>8,281,000</b>	<b>104,393.67</b>	
<b>Gross Margin</b>	<b>312,238,530</b>	<b>3,902,981.63</b>	
<b>GM = (TR – TVC)</b>			
<b>Net Income</b>	<b>303, 957,530</b>	<b>3,798,587,96</b>	
<b>NI = (GM – TFC)</b>			
PI	0.90	0.90	
RRI	961.8	959.4	
RRVC	1403.3	0.1403	
Operating Ratio	0.069	0.069	

Source: Field Survey 2010

Table 3 revealed that cost has several components which include variable cost and fixed cost making up the total cost. An analysis of cost showed that the variable cost accounted for 23,320,470 while its mean is to the tune of 291,505.87. It should be noted here that the variable cost accounts for the greatest source of cost in the business, this indicates that the higher the farm size, the higher the variable cost incurred. The fixed cost of production has its mean as 104,393.67 which include the fence cost, pond cost, fishing net cost and scale cost that accounted for the larger part of the fixed cost; Total revenue comes from the sales of fish alone while it is important to note that certain factors such as cost of feed, sources of water and farm size normally affect total farm revenue. The gross margin of the sampled business of all the farms irrespective of the farm size is ₦312,235,530 while it has a mean of ₦3,902,981.63. The net income for all producers has a mean of ₦3,798,587.96.

The finding also revealed that the producers' minimum investment has the profitability index of 0.90 indicating that out of every Naira earned about 90k is returned to the producers' net income. Also, the producer earns ₦961.80 profit on every Naira put into the business, the rate of variable cost was estimated as ₦1,403.30 that is every ₦1 incurred on variable inputs generated about ₦1,403.30 which can be deduced that proper use of variable inputs in the study area is being put to place. Operating ratio that

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is less than one indicates a good, efficient and profitable business, therefore, the producer with minimum investment has the operating ratio of 0.069, there is the indication of greater TR over TVC which is good for all the business investment level. It can therefore be concluded based on the above results that fish production is assessed to be profitable. However, fish producers with higher investment are more profitable than the lower ones in the study area.

### **Conclusion**

The study confirmed that lack of capital and high cost of feeds was a major constraint to growth and expansion of fish producers' activities which really affect the profitability level of the producers. There is high cost-return structure of the producers indicating that fish production is profitable and it is worth investing on. Based on the findings of this study, it is concluded that fish production is not only viable but profitable and can be used to increase local production and supply of fish in the country.

### **Recommendations**

Based on the findings of the study, the following recommendations are made:

1. Credit facilities or fish farming development loan with low or reasonable interest rates should be made available by government to fish farms established in the study area. Community banks and co-operative banks could also assist adequately in this regard.
2. Pre-and on-season workshop, training, conferences and seminars should be organized by government and non-government organizations to educate farmers on how to effectively manage fish farming establishments, stimulate and solve operational and expansion problems that might arise in the course of production.
3. Availability of modern hatching facilities in particular in commercial hatcheries for large scale fingerlings production is also important.
4. Findings should be carried out on fast growing feed that can enhance and increase the rate of development of fish, improve feed conversion rate, and ensure higher fish survival rate.
5. Government at all levels should subsidize the cost of input used by fresh fish producers when this is done the cost of production will be low and more people will go into fish production.

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